REMARKS

These remarks are in response to the Office Action mailed January 29, 2004. Claim 29 has been canceled, without prejudice to Applicants' right to prosecute the canceled subject matter in any divisional, continuation, continuation-in-part, or other application. Claims 8, 14, 28, 30-31 and 33 have been amended. Support for the amendments to the claims can be found throughout the specification as filed. Claim 34 has been added. Accordingly, no new matter is believed to have been introduced.

I. REJECTION UNDER 35 U.S.C. §112, SECOND PARAGRAPH

Claims 8-11 stand rejected under 35 U.S.C. §112, second paragraph as allegedly incomplete for omitting essential steps. The Office Action alleges that the omitted steps are: contacting the enzyme with β-glycoside in claim 8.

Applicants have amended claim 8 to reflect that the enzyme is contacted with β-glycoside. Accordingly, the rejection may be withdrawn.

II. REJECTION UNDER 35 U.S.C. §112, FIRST PARAGRAPH

Claims 8-11, 28-30 and 33 stand rejected under 35 U.S.C. §112, first paragraph, because while the specification is enabling for methods of use of SEQ ID NO:2, the specification allegedly does not provide enablement for methods of use of tetramers of variants of SEQ ID NO:2, wherein a plurality of amino acid residues are deleted, replaced or added, or where said variants are encoded by DNA sequences that can hybridize to SEQ ID NO:1 under wash temperatures of 25 °C or 55 °C. In addition, these same claims allegedly contain subject matter that was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Applicants respectfully traverse this rejection with respect to the claims as amended.

Applicants respectfully submit that the generation of variants of the enzymes provided by the disclosure are well within the ability of those skilled in the art. Random mutagenesis and

high-throughput screening can generate and screen thousands of variant proteins in a matter of a few hours. Thus, minor modification in the amino acid sequence of the enzyme or in the nucleotide sequence encoding the same can be made such that the resulting enzyme has a similar activity as that of the original enzyme.

The specification provides one aspect of the amino acid sequence of a β-glycosidase and one aspect of the nucleotide sequence encoding the same. However, a person skilled in the art could easily obtain the modified enzyme having an amino acid sequence in which one or a plurality of amino acids are deleted, replaced or added in accordance with any known techniques, such as site-specific mutagenesis and the PCR method (see, e.g., the specification at page 8, lines 6-11). In addition, a person skilled in the art could easily confirm as to whether the modified enzyme has the same activity as that of the polypeptide as shown in SEQ ID NO: 2 by conducting the hydrolysis of the β-glycoside having a long alkyl chain at the reducing end with such an enzyme in accordance with the description of the specification (see the Example section of the specification).

Also, a person skilled in the art could easily obtain a nucleic acid that hybridizes with the nucleic acid as shown in SEQ ID NO: 1 and has the same activity as that of the polypeptide as shown in SEQ ID NO: 2 in accordance with the known techniques and the description of the specification. Applicants respectfully submit that the guidelines issued by the PTO (see, e.g., the Written Description Guidelines, Example, 9) indicate that claims that include language directed to nucleic acids that hybridize to an identified sequence and encode a protein having a specific function satisfy the written description requirement. For example, the Guidelines provided by the PTO state,

> Now turning to the genus analysis, a person of skill in the art would not expect substantial variation among species encompassed within the scope of the claims because the highly stringent hybridization conditions set forth in the claim yield structurally similar DNAs. Thus, a representative number of species is disclosed, since highly stringent hybridization conditions in combination with the coding function of DNA and the level of skill and knowledge in the art are adequate to determine that applicant was in possession of the claimed invention.

As set forth in Applicants' claimed invention, the nucleic acids hybridize under identified conditions to a specific sequence (i.e., SEQ ID NO:1), wherein the nucleic acid encodes a polypeptide having an identified activity (i.e., β-glycosidase activity). Here the requirements set forth in the PTO guidelines are met. Accordingly, the rejection may be properly withdrawn.

III. REJECTION UNDER 35 U.S.C. §103

Claims 8-11, 14-24, 28-31 and 33 stand rejected under 35 U.S.. §103 as allegedly unpatentable over Kawarbayasi et al. (DNA Res., 5:55-76, 1998) in view of Current enzyme assay techniques. Applicants respectfully traverse this rejection.

Kawarabayashi et al. do not teach or suggest any functional (e.g. substrate specificity) or structural characteristics of the β-glycosidase as recited in application specification and claims. Rather Kawarabayashi et al. discloses only the genome sequence of *Pyrococcus horikoshii*. The β-glycosidase is localized in a membrane fraction and solubilized with 2.5% Triton X-100 and the stability of the β-glycosidase depends on the presence of Triton X-100. Therefore, if the genome sequence of *Pyrococcus horikoshii* and the ORF of the β-glycosidase were known, a person skilled in the art could not have easily isolated the β-glycosidase as a matter of routine experimentation.

Furthermore, the β-glycosidase as set forth in Applicants' claims has a novel substrate specificity with k_{cat}/K_m values high enough for hydrolysis of β-glycosides with long alkyl chain at the reducing end (*see, e.g.,* page 19, lines 11-12 of Applicants' specification). The β-glycosidase also exert its enzyme activity even at high temperatures and maintains the stability in organic solvents (*See, e.g.,* Figure 2, and page 21, line 6).

These novel characteristics of the β-glycosidase are not taught or suggested nor are they obvious from the Kawarabayashi et al. reference. Accordingly, Applicants respectfully request withdrawal of the §103 rejection.

Enclosed is a $122 check for excess claim fees. Please apply any other charges or credits to deposit account 06-1050.

Respectfully submitted,

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